

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently Amended) A tissue cutting instrument, comprising:
an outer member;
an inner member received within the outer member, the inner member defining a passage for removal of cut tissue through the inner member; and
a cutter coupled to the inner and the outer members such that rotation of the inner member about an axis causes off-axis movement of the cutter;
wherein the coupling of the cutter to the outer member restrains the cutter from following the rotation of the inner member.

2. (Original) The instrument of claim 1 wherein the outer member includes a terminal end at a distal end.

3. (Original) The instrument of claim 2 wherein the terminal end is spherical.

4. (Withdrawn) The instrument of claim 2 wherein the terminal end is flat.

5. (Original) The instrument of claim 2 wherein the terminal end defines an opening therein, the terminal end opening including a cutting portion.

6. (Original) The instrument of claim 5 wherein the terminal end opening is formed by a cut into the terminal end.

7. (Withdrawn) The instrument of claim 6 wherein the terminal end opening is formed by at least two cuts into the terminal end.

8. (Withdrawn) The instrument of claim 7 wherein each of the two cuts is cylindrical, the two cuts being perpendicular to each other.

9. (Withdrawn) The instrument of claim 7 wherein each of the two cuts is v-shaped.

10. (Withdrawn) The instrument of claim 7 wherein each of the two cuts is flat.

11. (Original) The instrument of claim 2 wherein the outer member includes a first chamber and a second chamber, the chambers being located in an inner surface of the terminal end of the outer member.

12. (Original) The instrument of claim 11 wherein each chamber is arch-shaped.

13. (Original) The instrument of claim 12 wherein the cutter comprises a first shaft and a second shaft, each shaft of the cutter assembling in a respective one of the chambers.

14. (Original) The instrument of claim 1 wherein the inner member includes a plurality of teeth at its distal end.

15. (Original) The instrument of claim 1 wherein the inner member rotates axially and the cutter rotates in a direction perpendicular to the direction of rotation of the inner member.

16. (Original) The instrument of claim 1 wherein the cutter comprises a hollow body, the body defining an opening therethrough.

17. (Original) The instrument of claim 16 wherein the body comprises a sphere.

18. (Original) The instrument of claim 16 wherein the cutter opening comprises a cutting portion and an extended portion.

19. (Original) The instrument of claim 16 wherein the cutter opening is formed by a cut through the cutter.

20. (Withdrawn) The instrument of claim 19 wherein the cutter opening is formed by at least two cuts through the cutter.

21. (Original) The instrument of claim 16 wherein the cutter opening is molded.

22. (Withdrawn) The instrument of claim 20 wherein each of the two cuts are circular, the two cuts overlapping to form a cutting portion and an extended portion.

23. (Original) The instrument of claim 16 wherein the cutter comprises a first shaft and a second shaft, the shafts being located 180° apart from each other along an outer surface of the cutter.

24. (Original) The instrument of claim 23 wherein the first shaft comprises a plurality of teeth extending from an outer circumference of the first shaft.

25. (Original) The instrument of claim 24 wherein the inner member includes a plurality of teeth on its distal end, and the teeth of the first shaft of the cutter engage with the teeth of the inner member to move the cutter.

26. (Original) The instrument of claim 25 wherein the inner member rotates axially and the cutter rotates in a direction perpendicular to the direction of rotation of the inner member.

27-36. (Cancelled)

37. (Previously presented) A tissue cutting instrument, comprising:
an outer member having a terminal end;
an inner member received within the outer member; and

a cutter coupled to the inner and the outer members, the cutter including an extended portion extending distal of the terminal end, the cutter configured and arranged to perform end-on cutting by shearing tissue between a surface of the cutter and another surface of the tissue cutting instrument.

38. (Withdrawn) The method of claim 34 wherein the member comprises an inner member, and rotating the inner member comprises rotating axially and movement of the cutter comprises rotation in a direction perpendicular to the direction of rotation of the inner member, wherein movement of the cutter includes engaging the cutter and the inner member while rotating the inner member.

39-40. (canceled)

41. (Previously presented) The instrument of claim 37 wherein the first surface comprises a surface of the outer member.

42. (Previously presented) The instrument of claim 1 wherein the inner member is configured and arranged to rotate about a single axis and the cutter is directly coupled to the inner member.

43. (Previously presented) The instrument of claim 1 wherein the cutter is coupled to the inner and the outer members such that rotation of the inner member about an axis causes an off-axis movement of the cutter for cutting tissue, the off-axis movement alone being capable of acting to cut tissue.

44. (Previously presented) The instrument of claim 1 wherein the inner member includes a terminal end surface at a distal end.

45. (Previously presented) The instrument of claim 44 wherein the cutter being coupled to the inner member comprises the cutter being coupled to the terminal end surface of the inner

member such that rotation of the inner member about the axis causes the off-axis movement of the cutter.

46. (Previously presented) The instrument of claim 44 wherein the terminal end surface includes a plurality of teeth for engaging the cutter and causing the off-axis movement of the cutter in response to rotation of the inner member about the axis.

47. (Currently Amended) A tissue cutting instrument, comprising:
an outer member;
an inner member received within the outer member; and
a cutter coupled to the inner and the outer members such that rotation of the inner member about an axis causes an off-axis movement of the cutter, ~~the off-axis movement alone being capable of acting to cut tissue~~

wherein during the off-axis movement, a cutting edge of the cutter intersects an axis of rotation of the inner member.

48. (Previously presented) The instrument of claim 47 wherein the cutter is configured to cut the tissue by shearing the tissue between a surface of the cutter and a surface of the outer member.

49. (Previously presented) The instrument of claim 47 wherein the cutter is configured and arranged to perform end-on cutting of the tissue.

50. (Previously presented) The instrument of claim 47 wherein the inner member is configured and arranged to rotate about a single axis and the cutter is directly coupled to the inner member.

51. (Previously presented) The instrument of claim 47 wherein the inner member includes a terminal end surface at a distal end.

52. (Previously presented) The instrument of claim 51 wherein the cutter being coupled to the inner member comprises the cutter being coupled to the terminal end surface of the inner member such that rotation of the inner member about the axis causes the off-axis movement of the cutter.

53. (Previously presented) The instrument of claim 51 wherein the terminal end surface includes a plurality of teeth for engaging the cutter and causing the off-axis movement of the cutter in response to rotation of the inner member about the axis.

54. (Previously presented) The instrument of claim 47 wherein the outer member includes a terminal end at a distal end.

55. (Previously presented) The instrument of claim 54 wherein the terminal end is spherical.

56. (Previously presented) The instrument of claim 54 wherein the terminal end defines an opening therein, the terminal end opening including a cutting portion.

57. (Previously presented) The instrument of claim 54 wherein the terminal end opening is formed by a cut into the terminal end.

58. (Previously presented) The instrument of claim 54 wherein the outer member includes a first chamber and a second chamber, the chambers being located in an inner surface of the terminal end of the outer member.

59. (Previously presented) The instrument of claim 58 wherein each chamber is arch-shaped.

60. (Previously presented) The instrument of claim 58 wherein the cutter comprises a first shaft and a second shaft, each shaft of the cutter assembling in a respective one of the chambers.

61. (Previously presented) The instrument of claim 47 wherein the inner member includes a plurality of teeth at its distal end.

62. (Previously presented) The instrument of claim 47 wherein the inner member rotates axially and the cutter rotates in a direction perpendicular to the direction of rotation of the inner member.

63. (Previously presented) The instrument of claim 47 wherein the cutter comprises a hollow body, the body defining an opening therethrough.

64. (Previously presented) The instrument of claim 63 wherein the body comprises a sphere.

65. (Previously presented) The instrument of claim 63 wherein the cutter opening comprises a cutting portion and an extended portion.

66. (Previously presented) The instrument of claim 63 wherein the cutter opening is formed by a cut through the cutter.

67. (Previously presented) The instrument of claim 63 wherein the cutter opening is molded.

68. (Previously presented) The instrument of claim 47 wherein the cutter comprises a first shaft and a second shaft, the shafts being located 180° apart from each other along an outer surface of the cutter.

69. (Previously presented) The instrument of claim 68 wherein the first shaft comprises a plurality of teeth extending from an outer circumference of the first shaft.

70. (Previously presented) The instrument of claim 69 wherein the inner member includes a plurality of teeth on its distal end, and the teeth of the first shaft of the cutter engage with the teeth of the inner member to move the cutter.

71. (Previously presented) The instrument of claim 70 wherein the inner member rotates axially and the cutter rotates in a direction perpendicular to the direction of rotation of the inner member.

72. (Currently Amended) A tissue cutting instrument, comprising:
an outer member;
an inner member received within the outer member; and
a cutter coupled to the inner and the outer members such that rotation of the inner member about an axis causes off-axis movement of the cutter, the cutter defining a through bore having an axis extending between open ends of the through bore.

wherein the cutter comprises first and second protruding shafts a first shaft and a second shaft, the first shaft protruding from a first surface of the cutter and the second shaft protruding from a second surface of the cutter, the first surface and the second surface being opposing surfaces located 180° apart from each other along an outer surface of the cutter, the shafts being aligned transverse to the through bore axis, and

wherein the first shaft comprises a plurality of teeth extending from an outer circumference of the first shaft.

73. (Previously presented) The instrument of claim 72 wherein the cutter comprises a hollow body, the body defining an opening therethrough.

74. (Previously presented) The instrument of claim 72 wherein the inner member includes a plurality of teeth on its distal end, and the teeth of the first shaft of the cutter engage with the teeth of the inner member to move the cutter.

75. (Previously presented) The instrument of claim 74 wherein the inner member rotates axially and the cutter rotates in a direction perpendicular to the direction of rotation of the inner member.

76. (Canceled) The method of claim 27 wherein the shearing of the tissue occurs against the surface of the cutter and against the other surface of the tissue-cutting instrument.

77. (Previously presented) The instrument of claim 37 wherein the shearing of the tissue occurs against the surface of the cutter and against the other surface of the tissue-cutting instrument.

78. (Previously presented) The instrument of claim 48 wherein the shearing of the tissue occurs against the surface of the cutter and against the surface of the outer member.

79. (New) The instrument of claim 1, wherein a maximum tangential speed of the cutter is at a center of cutting action.

80. (New) A tissue cutting instrument, comprising:
an outer member;
an inner member received within the outer member, the inner member defining a passage for removal of cut tissue through the inner member; and
a cutter coupled to the inner and the outer members such that rotation of the inner member about an axis causes off-axis movement of the cutter,
the cutter defining a second passage for removal of cut tissue therethrough, the second passage and the axis being axially alignable during the off-axis movement.

81. (New) A tissue cutting instrument, comprising:
an outer member;
an inner member received within the outer member; and

a generally spherical cutter coupled to the inner and the outer members such that rotation of the inner member about an axis causes off-axis movement of the cutter,

wherein the cutter comprises a first shaft and a second shaft, the first shaft protruding from a first surface portion of the cutter and the second shaft protruding from a second surface portion of the cutter, the first surface portion and the second surface portion being opposing surface portions located 180° apart from each other along an outer surface of the cutter, and wherein the first shaft comprises a plurality of teeth extending from an outer circumference of the first shaft.

82. (New) The instrument of claim 81, wherein the cutter defines a through bore having an axis extending between open ends of the through bore and the first shaft and the second shaft are aligned transverse to the through bore axis.